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Research Article

Determination of Antimicrobial Activities on Leaves of *Sesbania grandiflora* (Linn) (Pauk pan phyu)

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Abstract: The antimicrobial activity of *Sesbania grandiflora* (Pauk pan phyu) could be determined with various solvent by Agar well diffusion method on six selected microorganisms such as *Bacillus subtilis, Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus pumalis, Candida albicans* and *E. coli*. Among these selected microorganisms MeOH extract of leaves show medium activity on *Staphylococcus aureus, Bacillus pumalis* and *Candida albicans* and low activity on *Bacillus subtilis, Pseudomonas aeruginosa* and *E. coli*. The $CHCl_3$ extract of leaves show low activity on all tested microorganisms. The EtOAc extract of leaves (Pauk pan phyu) show high activity on all selected microorganisms.
Keywords: Microorganisms, antimicrobial activity, *Pseudomonas aeruginosa.*

Introduction

Medicinal plants can be important sources of unknown chemical substances with potential therapeutic effects. Besides, the World Health Organization has estimated that over 75% of the world's population still relies on plant-derived medicines, usually obtained from traditional healers, for basic health-care needs.

Traditionally, the plant has been used for the treatment of headache, in fever, as a tonic, in catarrh, as an astringent etc. The leaf is tonic and antipyretic and cures night-blindness. The dried leaves of *Sesbania grandiflora* is used in some countries as a tea which is considered to have antibiotic, anti-helminthic, anti-tumor and contraceptive properties.

Materials and Methods

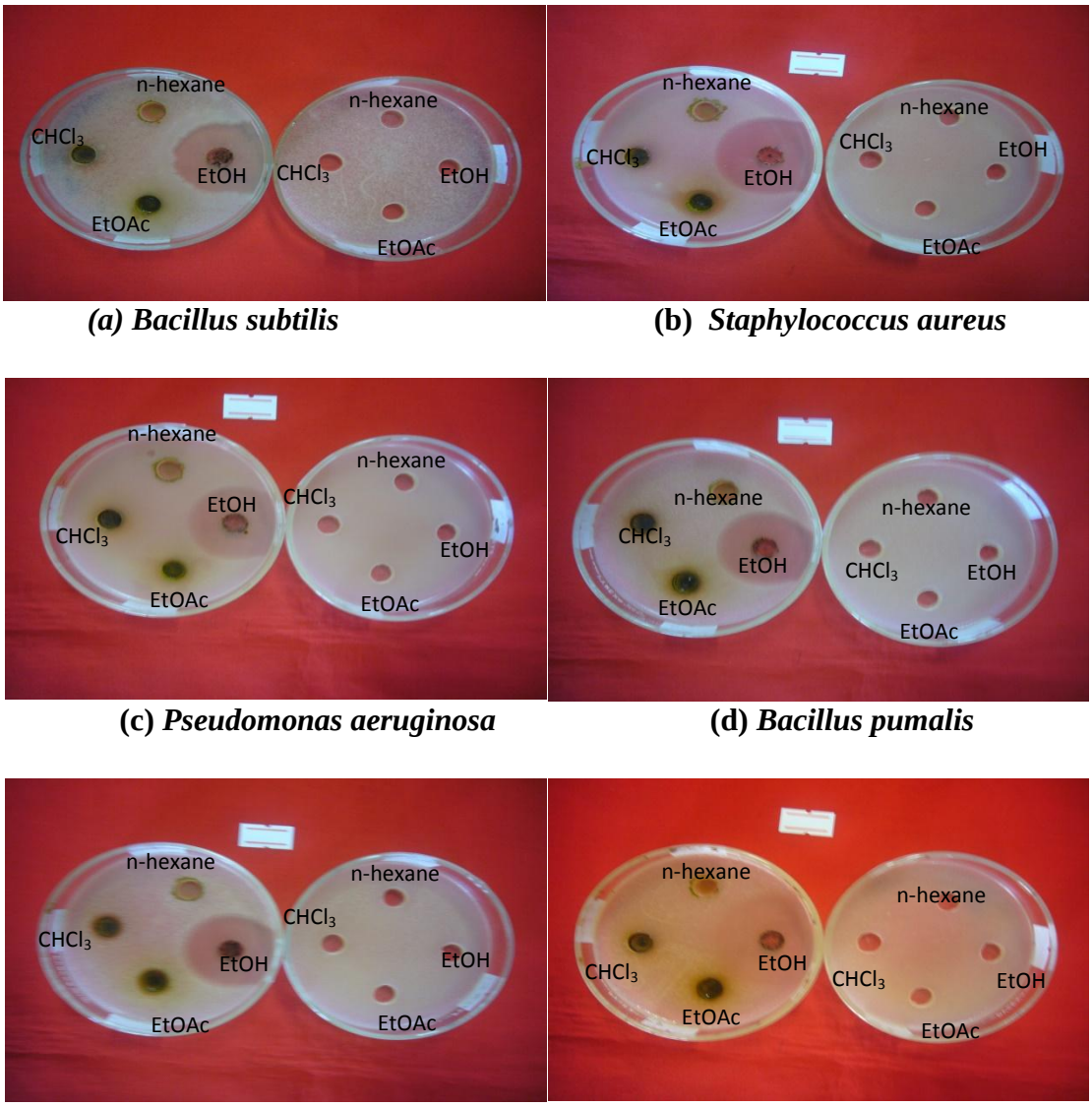
Culture of Bacteria

A few colonies of the organism to be tested were inoculated into the triple sugar iron agar and incubated at 37°C for 24 hours in an incubator. A few colonies of the organism from the triple sugar iron agar were introduced into the trypticase soy broth and incubated for 3 hours at 37°C to obtain the bacterial suspension of moderate cloudiness. This contained approximately 10^5 to 10^7 organisms per cm^3.

Screening by Agar Well Diffusion Method

The agar well diffusion method was used to test the antimicrobial action of the extracts on 24 hours broth culture of the organisms used. The extracts of PE, $CHCl_3$, EtOAc, EtOH and MeOH (1g each) were dissolved in 1cm^3 of their respective solvents. 0.2 ml each of the bacterial suspension from broth culture was spread evenly onto the surface of the nutrient

agar plates. Immediately after hardening of the agar, well were made with a 10 mm sterile cork-borer. After removing the agar, the wells were filled with 0.2 ml each of the drug extract to be tested. The plates were incubated at 37°C for 18-24 hours. The diameters of the inhibition zone including 10 mm wells were measured and recorded in mm. The results are shown in Table (1) and Figure (1).



(a) Bacillus subtilis **(b) *Staphylococcus aureus***

(c) *Pseudomonas aeruginosa* **(d) *Bacillus pumalis***

(e) *Candida albicans* **(f) *E.coli***

Figure 1. Antimicrobial Activities of Various Solvent Extract of Leaves of *Sesbania grandiflora* (Linn).

Results and Discussion

Antimicrobial Activities of the leaves and flowers of *Sesbania grandiflora* (Linn.)

The antimicrobial activity of leaves were tested with various solvent extract by using Agar well diffusion method in DCPT (Development Center for Pharmaceutical Technology) Insein, Yangon. The applying microorganisms are *Bacillus subtilis, Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus pumalis, Candida albicans* and *E.coli* species. The resultant data are tabulated in table (1). The length of the diameters show the degree of antimicrobial activity. The larger the inhibition zone diameter, the higher the antimicrobial activity.

Table 1. Results of Antimicrobial Activities of the *Sesbania grandiflora* (Linn)

Sample	Solvents	Organisms					
		I	**II**	**III**	**IV**	**V**	**VI**
Pauk pan phyu (Leaf)	Pet-ether	-	-	-	-	-	-
	$CHCl_3$	12 mm (+)	13 mm (+)	13 mm (+)	13 mm (+)	12 mm (+)	12 mm (+)
	MeOH	13 mm (+)	15 mm (++)	13 mm (+)	15 mm (++)	15 mm (++)	14 mm (+)
	EtOAc	35 mm (+++)	42 mm (+++)	37 mm (+++)	35 mm (+++)	36 mm (+++)	43 mm (+++)
Control	Pet-ether	-	-	-	-	-	-
	$CHCl_3$	-	-	-	-	-	-
	MeOH	-	-	-	-	-	-
	n-hexane	-	-	-	-	-	-
	EtOAc	-	-	-	-	-	-
	EtOH	-	-	-	-	-	-
Agar well – 10 mm 10 mm ~ 14 mm (+) 15 mm ~ 19 mm (++) 20 mm above (+++)		* Organisms* (I) *Bacillus subtilis* (N.C.T.C -8236) (II) *Staphylococcus aureus* (N.C.P.C-6371) (III) *Pseudomonas aeruginosa* (6749) (IV) *Bacillus pumalis* (N.C.I.B-8982) (V) *Candida albicans* (VI) *E.coli* (N.C.I.B-8134)					

According to the results from Table, it was found that pet-ether, $CHCl_3$, MeOH, EtOAc, n-hexane and EtOH extracts of *Sesbania grandiflora* (Linn) leaves showed the antimicrobial activity against all strains of microorganisms. Among them, EtOAc extract of leaves respond high activity on all tested microorganisms. Furthermore, $CHCl_3$ extract of leaves and flowers show low activity on six selected microorganisms.

The MeOH extract of leaves responds medium activity on *Staphylococcus aureus*, *Bacillus subtilis* and *Candida albicans* and low activity on *Bacillus subtilis*, *Pseudomonas aeruginosa*, and *E.coli*. Pet-ether extract of leaves have no activity on all tested microorganisms. Therefore, from the observed data, the various solvent extract of *Sesbania grandiflora* possessed potent antimicrobial activity except pet-ether and n-hexane extract.

Conclusion

On the screening of antimicrobial activity showed that EtOAc extract of leaves have higher activity than the other extracts. The $CHCl_3$ extract of leaves have low activity. Then, the MeOH extract of leaves and show medium activity on all tested microorganisms. Thus, the flowers and young leaves of *Sesbania grandiflora* (Pauk pan phyu) are edible and are often used to supplement meals.

Conflicts of interest

There is no conflict of interest of any kind.

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